

In the Specification:

Please substitute the following paragraphs/sections for the pending paragraphs/sections.

Substitute the 1st full paragraph on page 7, with the following paragraph:

The present invention is a method for manufacturing a piezoelectric material having a perovskite crystal structure expressed by the formula ABO_3 in which the symbol A represents at least an element "a" comprising a first step of producing an oxide containing an element "a' ", and a second step of producing a piezoelectric material by subjecting the oxide containing the element "a' " produced in the first step to a hydrothermal process using an aqueous solution containing the element "a", wherein the amount of element "a" contained in the piezoelectric material produced in the second step is increased due to its substitution for element "a' " contained in the oxide produced in the first step.

Substitute the 1st full paragraph on page 8, with the following paragraph:

The oxide produced in the first step may be a piezoelectric material expressed by the formula ABO_3 in which the symbol A represents at least an element "a", and having a perovskite crystal structure. This allows the hydrothermal process of the second step to be performed for the piezoelectric material that has already been crystallized in a perovskite crystal structure, and allows the element "a" at the A site of this piezoelectric material to be substituted with the element "a".

Substitute the third paragraph on page 11 that continues to the top of page 12, with the following paragraph:

In another method of the present invention for manufacturing a piezoelectric material, the element "a" is barium, the element "a'" is lead, and the element expressed by the symbol B is titanium. Furthermore, the oxide produced in the first step is preferably lead titanate ($PbTiO_3$) composed of acicular crystals. It is also preferable if the first step produces the oxide by Metal-Organic Deposition (hereinafter "MOD"). This makes it possible to manufacture a piezoelectric material that is $BaTiO_3$ composed of acicular crystals with a large grain size, and more accurately, barium-lead titanate expressed by the chemical formula $(Ba_xPb_{1-x})TiO_3$, where x in the formula is within the range of $0 < x < 0.05$, which was difficult to manufacture with a conventional method.

Substitute the first full paragraph of page 12, with the following paragraph:

The piezoelectric material of the present invention is expressed by the chemical formula $(\text{Ba}, \text{Pb})\text{TiO}_3$, wherein the piezoelectric material is composed of acicular crystals, at a specific spacing there are dislocation layers in which lattice defects are present, and the spacing between adjacent dislocation layers is at least 10 nm. This makes it possible to provide barium-lead titanate with excellent voltage resistance and good piezoelectric characteristics. In particular, it is possible to provide barium-lead titanate expressed by the chemical formula $(\text{Ba}_x\text{Pb}_{1-x})\text{TiO}_3$, where x in this formula is within the range of $0 < x < 0.05$.

Substitute the first full paragraph of page 24, with the following paragraph:

A piezoelectric film precursor with a thickness of $0.4 \mu\text{m}$ and comprising four laminated layers is obtained in the above process. In addition to the sol-gel method discussed above, the step of forming the piezoelectric film precursor can also be accomplished by RF sputtering, ion beam sputtering, MOD (Metal-Organic Deposition), electron beam vapor deposition, or another such method.

Substitute the first full paragraph of page 37, with the following paragraph:

A piezoelectric actuator, which is a piezoelectric element, equipped with a piezoelectric material expressed by the compositional formula $\text{Pb}_x\text{Ba}_{(1-x)}(\text{Zr}_{56}\text{Ti}_{44})\text{O}_3$ was manufactured according to the above third manufacturing method. Figure 13 is a graph of the EDX spectrum piezoelectric precursor film as the composition before hydrothermal processing. As a comparative example of a conventional method, Figure 10 is a graph of the EDX spectrum of the final product when the hydrothermal processing was performed with an alkali aqueous solution of just $\text{Ba}(\text{OH})_2$ (molar ratio of barium and lead = 1:0). As Example 1 of the present invention, Figure 11 is a graph of the EDX spectrum of the final product when the hydrothermal processing was performed with an alkali aqueous solution in which the molar ratio of barium and lead was adjusted to 6:4. As Example 2 of the present invention, Figure 12 is a graph of the EDX spectrum of the final product when the hydrothermal processing was performed with an alkali aqueous solution in which the molar ratio of barium and lead was adjusted to 4:6.

Substitute the third paragraph on page 40 that continues to the top of page 41, with the following paragraph:

It is generally preferable for the crystal grains to be large and acicular in order to enhance the piezoelectric characteristics of a piezoelectric material. However, it is difficult to produce large, acicular crystal grains from barium titanate (BaTiO_3), and the crystal grains turn out small when manufactured by MOD or a sol-gel method, for example. In contrast, it is relatively easy to produce large-diameter, acicular crystal